We claim:

1. A heat exchange catheter system for cooling a target organ, the heat exchange catheter system adapted for placement within an anatomical structure of a subject, comprising:
(a) a first elongate tubular body 1 having a proximal end and a distal end,
(b) a second elongate tubular body 2 having a proximal end and a distal end, and
(c) a balloon 4 defining a lumen 8 in fluid communication with both the first elongate tubular body 1 and the second elongate tubular body 2 so as to form a continuous fluid pathway, and wherein the balloon, when inflated, is adapted to conform in shape and size to the interior of the anatomical structure such that when placed within the anatomical structure and inflated, the outer surface of the balloon is at least partially in contact with the inner surface of the anatomical structure providing a heat exchange surface by which heat is exchanged between the anatomical structure and interior of the balloon, and whereby a target organ adjacent to the anatomical structure is thereby cooled.

2. The heat exchange catheter system of claim 1 further comprising a thermal exchange composition within balloon lumen 8.

3. The heat exchange catheter system of claim 2 wherein the thermal exchange composition flows within the continuous fluid pathway formed by the second elongate tubular body 2, the first elongate tubular body 1, and the balloon lumen 8.

4. The heat exchange catheter system of claim 1 wherein the second elongate tubular body disposed longitudinally within the first elongate tubular body 1.

5. The heat exchange catheter system of claim 1 wherein the subject is a human subject, wherein the anatomical structure is the esophagus, and the target organ is the heart.

6. The heat exchange catheter system of claim 1 wherein the balloon is shaped and sized for placement in the anatomical structure selected from the group consisting of: the esophagus, the oral cavity, the nasopharyngeal cavity, the auditory tube and tympanic cavity, the sinus of the brain, the

arterial system, the venous system, the larynx, the trachea, the bronchus, the stomach, the duodenum, the ileum, the colon, the rectum, the bladder, the ureter, the ejaculatory duct, the vas deferens, the urethra, the uterine cavity, the vaginal canal, and the cervical canal.

7. The heat exchange catheter system if claim 1 wherein the target organ is selected from the group consisting of: the myocardium of the heart, the lungs, the thymus, the thyroid, the liver, the pancreas, the kidney, the uterus, the ovary, the testis, the prostate, and the brain.

8. The heat exchange catheter system of claim 2 wherein the thermal exchange composition is selected from the group consisting of: a solid, a gel, a liquid, and a gas.

9. The heat exchange catheter system of claim 2 wherein the balloon conducts heat from the anatomical structure to the thermal exchange composition.

10. The heat exchange catheter system of claim 8 further comprising an ultrasound transducer affixed thereto.

11. The heat exchange catheter system of claim 1 further comprising a guide sheath fitted over at least a portion of the first elongate tubular body.

12. The heat exchange catheter system of claim 1 wherein the balloon, when inflated has a longitudinally disposed groove upon its outer surface.

13. The heat exchange catheter system of claim 1 further comprising a third elongate tubular body 3 having a proximal end and a distal end, the third elongate tubular body disposed longitudinally within the second elongate tubular body, and wherein the balloon is sealably affixed to the outer surface of the first elongate tubular body and sealably affixed to the outer surface of the third elongate tubular body.

14. The heat exchange catheter system of claim 13 further comprising a guidewire disposed

longitudinally within the third elongate tubular body, the guidewire having a proximal end and a distal end.

15. The heat exchange catheter system of claim 14 further comprising a digestible composition affixed at or near the distal end of the guidewire.

16. The heat exchange catheter system of claim 1, wherein the target organ is cooled at a rate of between about 0.5°C/hour and 30°C/hour.

17. The heat exchange catheter system of claim 1, wherein the target organ is cooled at a rate of between about 2.0°C/hour and 10°C/hour.

18. The heat exchange catheter system of claim 1, wherein the target organ is cooled at a rate of between about 5°C/hour to about 3°C/hour.

19. The heat exchange catheter system of claim 1, wherein the target organ is cooled at a rate of between about 0.5°C/30 minutes and 30°C/30 minutes.

20. The heat exchange catheter system of claim 1, wherein the target organ is cooled at a rate of between about 2.0°C/30 minutes and 10°C/30 minutes.

21. The heat exchange catheter system of claim 1, wherein the target organ is cooled at a rate of between about 2°C/30 minutes to about 5°C/30 minutes.

22. A heat exchange catheter system for cooling a target organ, the heat exchange catheter system comprising an inflatable saccular body defining a lumen, adapted to conform in shape and size to the interior of an anatomical structure, wherein when placed within the anatomical structure and inflated, the outer surface of the saccular body is at least partially in contact with the inner surface of the anatomical structure providing a heat exchange surface by which heat is exchanged

between the anatomical structure and the lumen of the saccular body, and whereby a target organ adjacent to the anatomical structure is thereby cooled.

23. A heat exchange catheter system of claim 22 further comprising a first elongate tubular body 1 having a proximal end and a distal end, wherein the inflatable saccular body is sealably affixed to the outer surface of the first elongate tubular body.

24. A heat exchange catheter system of claim 23 further comprising a second elongate tubular body 2 having a proximal end and a distal end, wherein the inflatable saccular body is sealably affixed to the outer surface of the second elongate tubular body.

25. A heat exchange catheter system of claim 22 further comprising a first elongate tubular body 1 in fluid communication with the saccular body, wherein the saccular body is sealably affixed to the outer surface of the first elongate tubular body, and further comprising a second elongate tubular body 2 wherein the second elongate tubular body is disposed longitudinally within the first elongate tubular body.

26. A device for transesophageal cooling of the heart of a subject comprising: (a) a reservoir adapted in shape and size to conform to the lumen of the esophagus, and (b) a thermal exchange composition disposed within the reservoir.

27. The device of claim 26 wherein the reservoir is a flexible reservoir.

28. The device of claim 27 wherein the inflatable reservoir is an elastic reservoir.

29. The device of claim 26 further comprising one or more tubes in fluid communication with the reservoir.

30. The device of claim 29 further comprising a pump in fluid communication with one or more of the tubes, wherein the pump circulates the thermal exchange composition through the tubes and the reservoir.

31. A method of altering the temperature of the myocardium of the heart in a subject, the method comprising the steps of:

(a) providing a thermal exchange composition, and

(b) placing the thermal exchange composition within the esophagus of the subject, whereby the myocardium of the heart is cooled.

32. The method of claim 31 wherein the thermal exchange composition is contained within a reservoir.

33. The method of claim 32 wherein the reservoir comprises a balloon, shaped and sized to fit within the lumen of the esophagus.

34. A method of altering the temperature of the myocardium of the heart in a subject, the method comprising the steps of: placing the heat exchange catheter system of claim 3 into the esophagus of a subject and circulating the thermal exchange composition within the continuous fluid pathway, whereby the myocardium of the heart is cooled.

35. The method of claim 34 wherein the temperature of the myocardium of the heart is altered at a rate of between about 0.5°C/hour and 30°C/hour.

36. The method of claim 34 wherein the temperature of the myocardium of the heart is altered at a rate of between about 3°C/hour and 5°C/hour.